AF
DRW

Docket 86266AJLT
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Bryan V. Hunt, et al

PHOTOTHERMOGRAPHIC MATERIALS WITH IMPROVED IMAGE TONE

Serial No. 10/686,806

Filed October 16, 2003

Group Art Unit: 1752

Examiner: Chea, Thorl

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Sherryl A. Payne

11/28/2005
Date

Mail Stop APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

APPEAL BRIEF TRANSMITTAL

Enclosed herewith is Appellants' Appeal Brief for the above-identified application.

The Commissioner is hereby authorized to charge the Appeal Brief filing fee to Eastman Kodak Company Deposit Account 05-0225. A duplicate copy of this letter is enclosed.

Respectfully submitted,

J. Lanny Tucker/s-p
Telephone: (585) 722-9332
Facsimile: (585) 477-1148

Attorney for Appellants
Registration No. 27,678

Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

Docket 86266A/JLT
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Bryan V. Hunt, *et al.*

PHOTOTHERMOGRAPHIC MATERIALS WITH IMPROVED IMAGE TONE

Serial No. 10/686,806

Filed October 16, 2003

Group Art Unit: 1752

Examiner: T. Chea

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Sherryl A. Payne

November 28, 2005
Date

Mail Stop APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

APPEAL BRIEF PURSUANT TO 37 C.F.R. 1.192

12/02/2005 EFLORES 00000054 050225 10686806
01 FC:1402 500.00 DA

Table Of Contents

APPELLANTS' BRIEF ON APPEAL

Pursuant to 35 U.S.C. §134, Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejections of Claims 1 and 4-12 that were contained in the Office Action mailed June 28, 2005.

A timely Notice of Appeal was filed September 28, 2005.

Real Party In Interest

The real party in interest is Eastman Kodak Company, the assignee of the inventors' entire interests.

Related Appeals And Interferences

None

Status Of The Claims

Claims 1 and 4-12 are the only pending claims in this application. All of these claims have been finally rejected and are on appeal

Status Of Amendments

Appellants presented a Request for Reconsideration after the Final Rejection, but no amendment were made to the claims. In his Advisory Action dated September 7, 2005, the Examiner maintained all of his final rejections of all pending claims.

Summary of Claimed Subject Matter

Photothermographic materials are commercially available for use in the medical imaging industry, and are particularly useful for diagnosis and archival of clinical images. One of the most important aspects of such photothermographic materials is their ability to record and communicate diagnostically significant image information in a readable form.

Radiologists often characterize diagnostic capability of photo-thermographic imaging materials with terms like sharpness, clarity, resolution, contrast, graininess, and crispness. However, it has been found that image tone

can play a significant role in how easily diagnostic information can be read from an image. Often, altering nothing but the tone of a photothermographic imaging material can either enhance or reduce the apparent sharpness and clarity in the resulting image.

Tone can be defined as the color of the image with respect to all densities. Tint can be defined as the color of the image in the unexposed background areas (Dmin).

Tinting dyes have been described in the art as a means for producing a material having tint within a specific color space. However, the use of tinting dyes will undesirably increase the background density (Dmin) in the unexposed portion of a film. The effectiveness of tinting dyes for adjusting color (that is, tone) decreases as the density of an image increases. For example, the use of tinting dyes to get a moderate shift in CIELAB a* and b* values (that is, tint) at an image density of 1.0 produces a much larger shift in a* and b* values in the background density (Dmin). In many cases, the most preferable tone may not be achieved by use of tinting dyes. Imaging materials are needed in which tone can be adjusted without adversely affecting tint and Dmin.

Moreover, because tinting dyes and colorants affect the background tint more than they affect tone at densities such as 1.0, a means is needed to achieve the desired image tone without adversely affecting background tint and Dmin.

The present invention is directed to a black-and-white (page 8, line 21), IR-sensitive (page 23, lines 20-23; and Sensitizing Dye A, page 58, and incorporated U.S. Patent 5,541,054) photothermographic material (page 8, lines 21-22) having a support (page 8, lines 22) and having at least one thermally developable layer on one side of the support (page 8, lines 22-23).

The thermally developable layer comprises a binder (page 8, line 23) and in reactive association, a photosensitive silver halide (page 8, line 24) that is spectrally sensitized to the infrared region of the spectrum (page 23, lines 20-23), a non-photosensitive source of reducible silver ions (page 8, lines 24-25), and a reducing agent composition (page 8, line 25).

The photothermographic material is designed so that upon imaging and development (heat-processing), it exhibits an image tone that is characterized as having a b* value at an optical density of 1.0 that is greater than the b* value at D_{min} (page 8, lines 26-28).

In addition, the thermally developable imaging layer(s) of the photothermographic material have a total absorbance of at least 1 at an exposure wavelength (page 29 lines 4-5).

Claim 4 is directed to chemical sensitizing of the photosensitive silver halide using a sulfur-containing chemical sensitizing compound as described on page 21 (lines 4ff).

Claim 5 is directed to the characteristic of the imaged photothermographic material having a tone represented by b* at D_{min} being more positive than –13 ("minus 13") as described on page 41 (lines 23-24).

Claim 6 is directed to an additional feature of the image tone whereby the b* at an optical density of 1.0 is greater than the b* at D_{min} by at least 0.3 as described on page 41 (lines 21-23).

Claim 7 is directed to the photothermographic material of this invention exhibiting a particular "hue angle" as described on page 41 (lines 25-28).

Claim 8 is directed to the support of the photothermographic material having a blue dye as described on page 42 (lines 4-5).

Claim 9 is directed to a method of forming a visible image in the photothermographic material described above using infrared radiation and development of the latent image by heating (page 8, line 29 to page 9, line 4).

Claim 10 is directed to additional steps of using the imaged photothermographic material to form an image in another imageable material (page 9, lines 5-12).

Claim 11 is directed to the method of the invention including use of the resulting image for medical diagnosis as described on page 9 (lines 20-21).

Claim 12 is directed to various means for imaging exposure as described on page 9 (lines 22-25).

Imaged photothermographic materials of the presently claimed invention exhibit the tone desired by the medical profession at the critical optical density between D_{min} and 1.0. Such images are observably sharper or clearer. It is not sufficient to have "colder" or "bluer" toned images for this to be true. Rather the relationship of b* and optical density was discovered to be critical to these desirable results. These critical features can be achieved in a number of ways as described on page 42 of the present application. The preferred means for achieving them is to control the shape, size, and arrangement of reduced silver particles.

In Comparative Examples A through F of the present application (pages 60-75), upon imaging and processing, the images were bluer (that is, the value of b* became more negative) as the optical density increased from D_{min} to 1.0. In contrast, in the Inventive Samples, upon imaging and processing, the samples became less blue (that is, the value of b* became more positive) as the optical density increased from Dmin to 1.0. As noted on page 71, radiologists preferred the tone and tint observed in the Inventive Samples.

Claims 1 and 4-12 defining the claimed invention and preferred embodiments are provided in Appendix A.

Issues For Review By The Board

There are three primary issues for the Board to consider:

1) Claims 1 and 4-12 were rejected under 35 U.S.C. §112(1) as lacking sufficient supporting disclosure. The Board is asked to consider whether Appellants' claim language is fully supported by the original disclosure. Appellants believe that it is.

2) Claims 1, 4-9 and 11 were rejected as anticipated under 35 U.S.C. §102(b) by each of several references. The Board is asked to consider whether Appellants' pending claims are novel over the disclosure in each of the cited references. Appellants believe that they are.

3) Claims 1 and 4-12 were also rejected under 35 U.S.C. §103(a) as being unpatentable over various cited references. Six separate unpatentability rejections were made. The Board is asked to consider whether all

of Appellants' pending claims are patentable over the cited art. Appellants believe that they are.

Grouping of Claims

Claims 1, 4, 5, and 8-12 are grouped together for purposes of appeal, and Claims 6 and 7 are considered separately for reasons presented in the Arguments below. It is submitted that even if the Board affirms the final rejection of Claims 1, 4, 5, and 8-12 for any reason, the subject matter of Claims 6 and 7 is separately novel and patentable.

Arguments

Final Rejections:

In paragraph 2 of the Final Rejection, Claims 1 and 4-12 were rejected under 35 U.S.C. §112(1) as failing to comply with the written description requirement. The Final Rejection argues that the specification fails to provide support for the limitation "a photosensitive silver halide that is specifically sensitized to the infrared region of the spectrum". While the Examiner admits that various imaging wavelengths are described in the specification, he argues that there "is no process of spectrally sensitiz[ing] the photosensitive silver halide in the infrared region of the electromagnetic spectrum disclosed therein".

In paragraph 5 of the Final Rejection, Claims 1, 4-9, and 11 were rejected as either anticipated under 35 U.S.C. §102(b) by U.S. Patent 5,698,380 (Toya) or unpatentable under 35 U.S.C. §103(a) in view of Toya. The Final Rejection points to Cols. 15-21 and Example 2 of Toya as teaching antihalation dyes and infrared radiation sensitization. The Final Rejection admits that Toya may not state specifically that the b* value at an optical density of 1.0 should be greater than the value of b* at D_{min} as required by the presently claimed invention, but argues that this value would be inherent in the materials of Toya (Col. 16, Dye I-1 coated at 10 mg/m^2). In the absence of a showing otherwise, the claimed

invention is considered anticipated or *prima facie* obvious to a skilled worker in the art at the time the invention was made.

In paragraph 6 of the Final Rejection, Claims 10 and 12 were rejected as unpatentable over Toya in view of U.S. Patents 5,705,324 (Murray) and 5,172,419 (Manian). The Final Rejection argues that the claimed process is taught in Murray (Cols. 23-24, Claims 9 and 19) and that it would have been obvious to a worker of ordinary skill in the art at the time the invention was made to develop the material in Toya using the process of Murray. Manian is said to show the digitization of a medical film image (abstract and Cols. 6-10, Claims 1-12) and thus it would be obvious to a skilled worker at the time the invention was made to use a digitizing means of Manian to produce a medical film.

In paragraph 7 of the Final Rejection, Claims 1 and 4-9 were rejected as either anticipated or unpatentable over U.S. Patent 5,677,121 (Tsuzuki). The Examiner points to Cols. 19-23 and Examples 1-2 as showing sensitivity of the photothermographic material to 810 nm (IR region) and the presence of an antihalation dye and infrared dye (Dyes 2, 3, and 5 in Cols. 23-24). The Examiner also admits that Tsuzuki (mistakenly called "Toya") does not explicitly describe Appellants' b* values but argues that it would be inherent in the described materials. In the absence of a showing otherwise, the Examiner argues that Appellants' claimed invention would be either anticipated or *prima facie* obvious to a worker of ordinary skill in the art at the time the invention was made.

In paragraph 8 of the Final Rejection, Claims 10 and 12 were rejected as unpatentable over Tsuzuki taken with Murray and Manian. This rejection is similar to that described above relating to the combination of Toya with Murray and Manian. The Final Rejection argues that the claimed process is taught in Murray (Cols. 23-24, Claims 9 and 19) and that it would have been obvious to a worker of ordinary skill in the art at the time the invention was made to develop the material in Tsuzuki using the process of Murray. Manian is said to show the digitization of a medical film image (abstract and Cols. 6-10, Claims 1-

12) and thus it would be obvious to a skilled worker at the time the invention was made to use a digitizing means of Manian to produce a medical film.

In paragraph 9 of the Final Rejection, Claims 1 and 4-9 were rejected as either anticipated by U.S. Patent 6,146,823 (Katoh) or unpatentable over Katoh. The Examiner argues that Cols. 39-45 and Example 1 of Katoh describes imaging at 780 nm (IR region) and that Col. 16 describes the use of a dyestuff to provide a photothermographic material of at least 0.8 [optical density]. As in the previous rejections, the Examiner also admits that Katoh does not explicitly describe Appellants' b* values but argues that it would be inherent in the described materials. In the absence of a showing otherwise, the Examiner argues that Appellants' claimed invention would be either anticipated or *prima facie* obvious to a worker of ordinary skill in the art at the time the invention was made

In paragraph 10 of the Final Rejection, Claims 10 and 12 were rejected as unpatentable over Katoh taken with Murray and Manian. This rejection is similar to that described above relating to the combination of Toya with Murray and Manian. The Final Rejection argues that the claimed process is taught in Murray (Cols. 23-24, Claims 9 and 19) and that it would have been obvious to a worker of ordinary skill in the art at the time the invention was made to develop the material in Katoh using the process of Murray. Manian is said to show the digitization of a medical film image (abstract and Cols. 6-10, Claims 1-12) and thus it would be obvious to a skilled worker at the time the invention was made to use a digitizing means of Manian to produce a medical film.

In paragraph 11 of the Final Rejection, the Examiner argues the Appellants' required b* value that characterizes the toning of the developed photothermographic material is inherent to the processing or developing the materials, rather a characteristic of the material prior to processing.

Moreover, in response to Appellants' request for reconsideration after the Final Rejection, the Examiner mailed an Advisory Action that maintained the rejection of all claims, and argued that Appellants' request did not "place the

application in condition for allowance because of the reasons set forth the Final Office Action. The photothermographic material of the claimed invention has [a] composition similar to those taught in the applied prior art of record, and it would have possesses[d] similar tone value. If the value of absorbance taught in the applied prior art of record is not exemplified by the applied prior art of record, [the] value is disclosed and overlaps the value claimed in the present claimed invention such as Kato[h] in column 16 which disclosed at least 0.8 at the exposure 750 nm to 1500 nm. Tsuzuki ('121) discloses the antihalation dye in the backing layer having optical density 0.3 to 2 at the maximum adsorption of 750 nm to 1400 nm. The worker of ordinary skill in the art would have use[d] the absorbing dye to provide an optical density with the range as taught in the image forming layer or in the backing layer prevent the reflection of the light exposure and thereby providing a sharper image. The Declaration under 37 C.F.R. 1.132 provided on August 18, 2005, even fully considered, fails to obviate the rejection set forth in the office action of record. It reflects the applicant's opinion rather than showing the difference between the claimed material and that of the applied prior art of record, or the unexpected improvement property of the claimed material over the applied prior art of record."

Each of the rejections and arguments made by the Examiner are now considered in turn.

Appellants' Claims 1 and 4-12 are fully supported by their original disclosure

The Final Rejection says that the specification fails to provide support for the limitation "a photosensitive silver halide that is spectrally sensitized to the infrared region of the spectrum". This is incorrect.

Inventive Examples 1, 2, 3, and 4, and Comparative Examples D, E, and F are all spectrally sensitized by Sensitizing Dye A (pages 58 and 64, line 12). This dye is a known infrared sensitizing dye. In the section on Spectral Sensitizers (page 23ff), Appellants have incorporated by reference U.S. Patent 5,541,054 (Miller et al.) that, in line 5, page 24, fully describes and exemplifies Sensitizing Dye A as an excellent infrared sensitizing dye (it is identified as Dye 1

in Column 10 of Miller et al.). Also, the Board's attention is directed to Column 4 (lines 34ff) where Miller et al. teaches that its invention is directed towards finding improved spectral sensitizing dyes to match exposure sources emitting in the wavelength range from 780 to 850 nm. The examples in Miller et al. (Columns 19-29) teach that Dye 1 (i.e. Appellants' Sensitizing Dye A) is an excellent sensitizing dye for samples that were exposed with a laser diode at 809 nm (Column 25, line 13), and that the samples were coated under infrared safelights (Column 24, line 53). Thus, this incorporated teaching clearly defines Sensitizing Dye A as an IR sensitizing dye.

It is also very well known that sensitizing dyes are used only to "sensitize" or change the radiation-absorbing characteristics of photosensitive silver halide grains. A sensitizing dye of any type would not be incorporated into the photothermographic material for any other reason. Appellants refer to this known fact in their application on page 23 (lines 20-23) of the original specification when they indicate that the photosensitive silver halide grains can be spectrally sensitized.

In addition, Inventive Examples 1, 2, 3, and 4, and Comparative Examples D, E, and F in the present application were all imaged and thermally developed using a commercially available DryView® 8700 Laser Imager (page 68, line 10, page 72, line 18). The DryView® 8700 Laser Imager is well known in the industry to use an infrared laser diode as its exposure source. During prosecution, the Examiner's attention was directed to a description of this commercially available imaging apparatus on the internet at:

< www.kodak.com/eknec/documents/af/0900688a800562af/J-700Eng.pdf >.

This web publication (a hard copy was supplied to the Examiner with Appellants' Rule 116 response) states, under the heading "How Kodak DryView Laser Imagers Work" that "an infrared laser diode exposes the film, and it (the film) is fed into the processor." Likewise, Comparative Example A of the present application is DryView Laser Imaging Film, well known in the industry as an infrared sensitized photothermographic film.

Finally, Appellants believe that one skilled in the art of organic chemistry in general and of spectral sensitization of photothermographic materials in particular would know that tricarbocyanine dyes having benzothiazole groups at each end and a 7-carbon chain having 4 alternating double bonds (such as Sensitizing Dye A) absorb in the infrared. This class of dyes is known and is described in, for example, F. M. Hamer, *Cyanine Dyes and Related Compounds*, John Wiley & Sons, New York, 1964, Chapter VIII, pp. 244-269. TABLE I on page 268 specifically lists benzothiazole tricarbocyanine (Y=Z=S) as having an absorption maximum in the infrared at 765 nm. A copy of pages 244, 252, and 268 has been supplied to the Examiner.

These facts are clearly indicative that Appellants' original disclosure fairly and adequately describes the use of "infrared-sensitized" photosensitive silver halide. The truth of Appellants' assertions is incontrovertible and it is inconceivable that the Examiner, who has worked in this art for some time, doesn't agree. The limitation of the present claims for "a photosensitive silver halide that is spectrally sensitized to the infrared region of the spectrum" is fully supported in the original specification by incorporated teaching as well as all of the inventive examples. Appellants therefore request that the Section 112(1) rejection be reversed.

Appellants' Claims 1, 4-9 and 11 are novel over Toya

The Final Rejection alleges that Toya teaches antihalation dye I-1 and spectral sensitizing dye 1, and an exposure wavelength of 780 nm that is within the infrared region and that the total absorbance of at least 1.0 at the exposure wavelength is said to be small enough to be inherent in the materials of Toya (Col. 16, Dye I-1 coated within an amount of 10 mg/m^2).

Appellants respectfully disagree. Appellants specifically recite in Claim 1: "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength".

Dye I-1, cited in Toya, is not in an imaging layer. Rather it is in Layer A of the element that is not an imaging layer. Moreover, Dye I-1 is incorporated into Layer A as a dispersion of microcrystalline dye (Column 9, line

63). It is not dissolved in solution. Because of this fact, Dye I-1 cannot diffuse into the adjacent imaging layer (Layer B) during coating (particulate dyes do not migrate like dyes in solution). Therefore, there is no significant absorbance incorporated into the imaging layers in Toya. This renders Toya as lacking disclosure to anticipate Appellants' invention of Claim 1 because Toya does not describe a material having an absorbance of at least 1.0 in the thermally developable layers.

The subject matter of Claims 4, 5, 8, 9, and 11 is also novel over Toya by virtue of their dependency upon novel Claim 1.

The subject matter of Claims 6 and 7 is novel over the teaching in Toya in its own right. Nothing in Toya describes a photothermographic material, that after imaging and processing, provides an image with tone having a b* value at an optical density of 1.0 at least 0.3 greater than the b* value at D_{min} (Claim 6). Moreover, Toya fails to describe a photothermographic material that exhibits a hue angle, h_{ab}, such that $220° < h_{ab}, < 260°$, where h_{ab} is the hue angle, $h_{ab} = \arctan(b^*/a^*)$, as measured at an optical density of 1.0, and as defined in the CIELAB color system (Claim 7). The Final Rejection tacitly admits this because it fails to point out the subject matter of Claims 6 and 7 in Toya.

Appellants' Claims 1, 4-9 and 11 are patentable over Toya

As pointed out above, Dye I-1 in Toya is located outside of the imaging layers. There is no suggestion or motivation provided in the teaching of Toya for a skilled worker to change its location in the material. The presently claimed invention requires the thermally developable layers to have the required total absorbance and to have the desired tone at the densities used in the medical field.

Neither the location of dyes to provide the required absorbance nor Appellants' purpose for this feature is suggested in Toya. This reference has no hint of the problem solved by Appellants, i.e. the need to adjust tone of the resulting images. This tone adjustment in the final image cannot be produced without a design change in the non-imaged photothermographic material, and Toya fails to appreciate any aspect of this problem or how to solve it.

In addition, the spectral sensitizing dye present in the imaging layer of Toya is present at far too small an amount to provide any significant absorbance as well. As described in Col 16, lines 44-55, the amount of spectral sensitizing dye incorporated into the imaging layer was $2x10^{-7}$ mol/m^2, or less than 0.1 mg/m^2. This is well below the amount required to provide an absorbance of at least 1.0 at an exposure wavelength. The Board is respectfully asked to consider the evidence provided in Co-Applicant Bryan Hunt's second **Rule 132 Declaration** (paragraph 7), presented with Applicants' Rule 116 response (mailed August 16, 2005), that Dye I of Tsuzuki (an infrared sensitizing dye) used at much higher coating weight still does not provide an absorbance of at least 1.0 at an exposure wavelength. The IR dyes described in Tsuzuki are comparable to those described in Toya and the evidence present in the Declaration is equally cogent for the arguments against the teaching of Toya.

Moreover, there is no technical basis for the Examiner's speculation that the required b* value required for the presently claimed invention is inherent in the materials of Toya. The imaging composition used in the Toya materials is no closer to the presently claimed invention than to the Comparative Examples A, B, and C materials described in Appellants' application that have been shown to be outside of Appellants' requirements and to fail at solving the tone problem. This is additional indication that Toya cannot suggest Appellants' invention in Claim 1.

In addition, the subject matter of Claims 4, 5, 8, 9, and 11 is also patentable over the teaching in Toya by virtue of their dependency upon patentable Claim 1.

The subject matter of Claims 6 and 7 is patentable over the teaching in Toya in their own right. Nothing in Toya teaches or suggests a photothermographic material, that after imaging and processing, provides an image with tone having a b* value at an optical density of 1.0 at least 0.3 greater than the b* value at D_{min} (Claim 6). Moreover, Toya fails to teach or suggest a photothermographic material that exhibits a hue angle, h_{ab}, such that $220° < h_{ab}, < 260°$, where h_{ab} is the hue angle, $h_{ab} = \arctan(b^*/a^*)$, as measured at an optical density of 1.0, and as defined in the CIELAB color system (Claim 7).

The Final Rejection tacitly admits this because it fails to point out the subject matter of Claims 6 and 7 in Toya. Thus, there is no basis for a *prima facie* unpatentability rejection of Claims 6 and 7 over Toya.

Appellants' Claims 10 and 12 are patentable over Toya with Murray and Manian

Method Claims 10 and 12 have been rejected over the combination of Toya, Murray, and Manian. While Appellants disagree on the merits because neither Murray nor Manian, individually or collectively, overcomes deficiencies pointed out above in Toya, Appellants are not relying on the features of Claims 10 and 12 for patentability. Those claims are dependent on Claim 9 that is dependent upon otherwise novel and patentable Claim 1 and thus the rejection of Claims 10 and 12 is without merit for the same reasons stated above.

Appellants' Claims 1 and 4-9 are novel over Tsuzuki

In paragraph 7 of the Final Rejection, it appears that the Examiner has confused Toya with Tsuzuki. Appellants disagree with this rejection for similar reasons presented above with respect to Toya.

Appellants specifically claim materials "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength". Dyes 1 through 5 described in Tsuzuki are used therein as spectral sensitizing dyes, which are of course, at levels far too small to provide any significant absorbance (see Col. 19-20 for the amount of less than 10 mg/m^2 for an upper limit by conventional calculations; the formulation has some ambiguity, but that is the highest level possible) and certainly not Appellants' required absorption of at least 1.0 at an exposure wavelength. To confirm this, Co-Appellant Bryan Hunt coated Dye 1 (shown in column 20 of Tsuzuki) at a coating weight of 10 mg/m^2 (described in Tsuzuki) and obtained a peak absorbance of less than 0.1 at 780 nm. This is far below Appellants' required absorption of at least 1.0 at the exposure wavelength for their thermally developable layer(s). In Example 2 (column 22, lines 45-47), Tsuzuki describes infrared sensitizing Dyes 2 to 5 at the same molar ratio as that used for Dye 1.

This too would result in absorption far below Appellants' required absorption of at least 1.0 at the exposure wavelength.

Tsuzuki uses Compound B for antihalation. It is located in a layer on the backside (non-imaging side) of the support. This dye provides an absorbance of 1.2 at 810 nm, but only on the backside and thus this teaching is irrelevant to Appellants' claimed invention. There is no significant component incorporated into the imaging layers in Tsuzuki to provide the absorbance required in the presently claimed invention. Thus, Tsuzuki lacks the disclosure to anticipate Appellants' claimed invention.

In addition, the subject matter of Claims 4, 5, 8, 9, and 11 is also novel over Tsuzuki by virtue of their dependency upon novel Claim 1.

The subject matter of Claims 6 and 7 is novel over Tsuzuki in their own right. Nothing in Tsuzuki describes a photothermographic material, that after imaging and processing, provides an image with tone having a b* value at an optical density of 1.0 at least 0.3 greater than the b* value at D_{min} (Claim 6). Moreover, Tsuzuki fails to describe a photothermographic material that exhibits a hue angle, h_{ab}, such that $220° < h_{ab}, < 260°$, where h_{ab} is the hue angle, $h_{ab} = \arctan(b^*/a^*)$, as measured at an optical density of 1.0, and as defined in the CIELAB color system (Claim 7). The Final Rejection tacitly admits this because it fails to point out the subject matter of Claims 6 and 7 in Tsuzuki.

Appellants' Claims 1 and 4-9 are patentable over Tsuzuki

The Final Rejection argues that the materials of Tsuzuki inherently have Appellants' required tone (b*) value and absorbance even though neither feature is specifically disclosed. Again, this is a speculative position stated by the Examiner without any technical reasoning or proof. The imaging compositions used in the materials described in Tsuzuki are no closer to Appellants' claimed materials than to the Comparative Examples A, B, and C materials described in Appellants' application that have been shown to be outside of Appellants' requirements and claimed invention, and to fail at solving the tone problem. This is an additional indication that Tsuzuki cannot suggest Appellants' invention in Claim 1.

As noted above, Appellants specifically claim materials "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength". The sensitizing dyes in Tsuzuki that are within the thermally developable layers are present at too small an amount to provide the necessary absorbance, and the antihalation materials are located in a non-imaging layer on the backside of the support. There is no reason or suggestion given in Tsuzuki that changing the location of the dyestuff from the backside to the frontside (imaging side) would be beneficial, as Appellants have unexpectedly found to provide adjusted tone after imaging and development. Tsuzuki fails to appreciate the problem solved by the present invention and therefore fails to teach Appellants' solution to the problem. Thus, Tsuzuki fails to teach or suggest presently claimed invention of Claim 1 and the unpatentability rejection should be reversed.

In addition, the subject matter of Claims 4, 5, 8, 9, and 11 is also patentable over the teaching in Tsuzuki by virtue of their dependency upon patentable Claim 1.

The subject matter of Claims 6 and 7 is patentable over the teaching in Tsuzuki in their own right. Nothing in Tsuzuki teaches or suggests a photothermographic material, that after imaging and processing, provides an image with tone having a b* value at an optical density of 1.0 at least 0.3 greater than the b* value at D_{min} (Claim 6). Moreover, Tsuzuki fails to teach or suggest a photothermographic material that exhibits a hue angle, h_{ab}, such that $220° < h_{ab}, < 260°$, where h_{ab} is the hue angle, $h_{ab} = \arctan(b^*/a^*)$, as measured at an optical density of 1.0, and as defined in the CIELAB color system (Claim 7). The Final Rejection tacitly admits this because it fails to point out the subject matter of Claims 6 and 7 in Tsuzuki. Thus, there is no basis for a *prima facie* unpatentability rejection of Claims 6 and 7 over Tsuzuki.

Appellants' Claims 10 and 12 are patentable over Tsuzuki with Murray and Manian

While Appellants disagree on the merits because neither Murray nor Manian, individually or collectively, overcomes deficiencies pointed out in

Tsuzuki, they are not relying on the features of Claims 10 and 12 for patentability. Those claims are dependent on Claim 9 that is dependent on otherwise novel and patentable Claim 1 and thus the rejection of Claim 10 and 12 is without merit for the same reasons stated above.

Appellants' Claims 1 and 4-9 are novel over Katoh

The Final Rejection alleges that Claims 1, 4-9 and 11 are anticipated by Katoh. Appellants respectfully disagree. Appellants specifically recite in Claim 1: "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength".

Katoh's disclosure in Column 16 (lines 1-14) does not describe the incorporation of a dyestuff into an imaging layer (i.e. thermally developable layer). While a dyestuff is added to the film to provide an absorbance of preferably at least 0.8 at an exposure wavelength, it is added to a dyestuff layer (that is, an antihalation layer, Col. 15, lines 66-67) that is disposed on the same side of the support as the photosensitive layer (i.e., imaging layer) or on the opposite side (backside) of the support. Here the dyestuff is not added to the imaging layer itself, and therefore does not add absorbance to the imaging layer. There is no suggestion of compounds incorporated into the thermally developable or imaging layers in Katoh to provide the required absorbance of at least 1.0 at the exposure wavelength. While Katoh mentions (Example 1) the presence of Dye A in the emulsion layer on the frontside of the support in a photothermographic material, this dye fails to provide the absorbance called for in the presently claimed invention. This renders Katoh as lacking disclosure to anticipate Appellants' claimed invention in Claim 1.

In addition, the subject matter of Claims 4, 5, 8, 9, and 11 is also novel over Katoh by virtue of their dependency upon novel Claim 1.

The subject matter of Claims 6 and 7 is novel over Katoh in their own right. Nothing in Katoh describes a photothermographic material, that after imaging and processing, provides an image with tone having a b* value at an optical density of 1.0 at least 0.3 greater than the b* value at D_{min} (Claim 6). Moreover, Katoh fails to describe a photothermographic material that exhibits a

hue angle, h_{ab}, such that $220° < h_{ab}, < 260°$, where h_{ab} is the hue angle, $h_{ab} = \arctan(b^*/a^*)$, as measured at an optical density of 1.0, and as defined in the CIELAB color system (Claim 7). The Final Rejection tacitly admits this because it fails to point out the subject matter of Claims 6 and 7 in Katoh.

Appellants' Claims 1 and 4-9 are patentable over Katoh

Appellants also disagree with the rejection of Claims 1 and 4-9 as unpatentable over Katoh because the Final Rejection argues that the materials of Katoh inherently have Appellants' required tone (b*) value and absorbance even though neither feature is specifically disclosed. Again, this is a speculative position by Examiner without any technical reasoning or proof. The compositions used in the materials described in Katoh are no closer to Appellants' claimed materials than to the Comparative Examples A, B, and C materials described in Appellants' application that have been shown to be outside of Appellants' requirements and claimed invention, and to fail at solving the tone problem.

As noted above, Appellants specifically claim materials "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength". Katoh's disclosure in Column 16 (lines 1-14) teaches the incorporation of a dyestuff into a layer other than an imaging layer and therefore does not teach the required absorbance of at least 1.0 in the imaging layer. There is no reason or suggestion given in Katoh that changing the location of the dyestuff would be beneficial, as Appellants have unexpectedly found. Katoh fails to appreciate the problem solved by the present invention and therefore fails to give any suggestion as to how it can be solved using Appellant's claimed invention. Thus, Katoh does not render the presently claimed invention in Claim 1 unpatentable.

In addition, the subject matter of Claims 4, 5, 8, 9, and 11 is also patentable over the teaching in Katoh by virtue of their dependency upon patentable Claim 1.

The subject matter of Claims 6 and 7 is patentable over the teaching in Katoh in their own right. Nothing in Katoh teaches or suggests a photothermographic material, that after imaging and processing, provides an

image with tone having a b* value at an optical density of 1.0 at least 0.3 greater than the b* value at D_{min} (Claim 6). Moreover, Katoh fails to teach or suggest a photothermographic material that exhibits a hue angle, h_{ab}, such that $220° < h_{ab}, < 260°$, where h_{ab} is the hue angle, $h_{ab} = \arctan(b^*/a^*)$, as measured at an optical density of 1.0, and as defined in the CIELAB color system (Claim 7). The Final Rejection tacitly admits this because it fails to point out the subject matter of Claims 6 and 7 in Katoh. Thus, there is no basis for a *prima facie* unpatentability rejection of Claims 6 and 7 over Katoh.

Appellants' Claims 10 and 12 are patentable over Katoh with Murray and Manian

While Appellants disagree on the merits because neither Murray nor Manian, individually or collectively, overcomes deficiencies pointed out in Katoh, they are not relying on the features of Claims 10 and 12 for patentability. Those claims are dependent on Claim 9 that is dependent on otherwise novel and patentable Claim 1 and thus the rejection of Claim 10 and 12 is without merit for the same reasons stated above.

Appellants' Response to Paragraph 11 of the Final Rejection

Appellants disagree with the Examiner's statements in paragraph 11. The claimed features of the present invention (that is, specific image tone in the resulting image) are obtainable only with a photothermographic material that is not described or suggested in any of the cited art. Appellants have provided comparative results using conventional photothermographic materials like those in Toya, Tsuzuki, and Katoh, and none of those materials, when imaged and heat processed, provided images with the required b* values. So, the claimed invention is not inherently described by the materials of the cited art, and the claimed "non-imaged" photothermographic materials are therefore novel and patentable thereover.

Appellants' Response to the Advisory Action Arguments

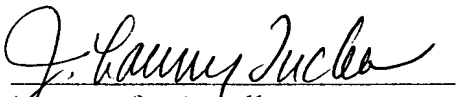
Similarly, Appellants disagree with the Examiner's arguments in the Advisory Action. As pointed out above, Appellants have demonstrated unexpected results over the teachings in the cited art, i.e. the conventional materials described and taught in the art would not inherently provide the desired image tone because the art does not suggest how to achieve that result. None of the prior art references teaches describes or teaches the incorporation of materials within the one or more thermally developable imaging layers to provide a total absorbance of at least 1.0 at an exposure wavelength. The only materials incorporated within the thermally developable imaging layers provide an absorbance at the imaging wavelength of much less than 1.0. Co-Appellant Bryan Hunt's **Rule 132 Declaration** provided after the Final Rejection contains not merely his opinion but a demonstration of the results from the use of a common IR sensitizing dye taught in Tsuzuki. Dye I of Tsuzuki (an infrared sensitizing dye) even when coated at much higher coating weight than that used by Tsuzuki, still does not provide an absorbance of at least 1.0 at an exposure wavelength. Thus, it is improper for that evidence to be ignored in consideration of the issues in this case.

Thus, Toya, Tsuzuki, or Katoh do not teach, suggest, or motivate a skilled worker to incorporate a dyestuff capable of absorbing at the exposure wavelength within an imaging layer of the material, and the only materials described in any of these references present within the imaging layer that are capable of absorbing at the exposure wavelength are present at too low a concentration to provided the necessary optical density. The claimed invention is therefore novel and patentable over the cited art.

Conclusion

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse all of the final rejections of Claims 1 and 4-12.

Respectfully submitted,



Attorney for Appellants
Registration No. 27,678

J. Lanny Tucker/s-p
Telephone: (585) 722-9332
Facsimile: (585) 477-1148
Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

Appendix I - Claims on Appeal

1. A black and white, infrared-sensitive photothermographic material comprising a support and having on at least one side thereof, one or more thermally developable imaging layers comprising a binder and, in reactive association, a photosensitive silver halide that is spectrally sensitized to the infrared region of the spectrum, a non-photosensitive source of reducible silver ions, and a reducing agent composition,

wherein said photothermographic material, when imaged and heat-processed, has an image tone that is characterized such that the value for b* for said imaged and heat-processed photothermographic material at an optical density of 1.0 is greater than its value for b* at Dmin, wherein b* is defined in the CIELAB color system, and

wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength.

4. The photothermographic material of claim 1 wherein said silver halide has been chemically sensitized with a sulfur-containing chemical sensitizing compound.

5. The photothermographic material of claim 1, when imaged and heat-processed, has an image tone that is characterized as having a b* value at Dmin that is greater than -13.

6. The photothermographic material of claim 1, when imaged and heat-processed, has an image tone wherein the value for b* at an optical density of 1.0 is greater than the value for b* at Dmin by at least 0.3.

7. The photothermographic material of claim 1 wherein the photothermographic material exhibits a hue angle, h_{ab}, such that $220° < h_{ab}, < 260°$, where h_{ab} is the hue angle, $h_{ab} = \arctan(b^*/a^*)$, as measured at an optical density of 1.0, and as defined in the CIELAB color system.

8. The photothermographic material of claim 1 further comprising a blue dye in the support or in one or more layers, or in both the support and one or more layers.

9. A method of forming a visible image comprising:

A) imagewise exposing the photothermographic material of claim 1 to infrared radiation to form a latent image, and

B) simultaneously or sequentially, heating said exposed photothermographic material to develop said latent image into a visible image.

10. The method of claim 9 wherein said photothermographic material has a transparent support and said method further comprises:

C) positioning said exposed and heat-developed photothermographic material between a source of imaging radiation and an imageable material that is sensitive to said imaging radiation, and

D) exposing said imageable material to said imaging radiation through the visible image in said exposed and heat-developed photothermographic material to provide an image in said imageable material.

11. The method of claim 9 wherein said imagewise exposed and heat-developed photothermographic material is used for a medical diagnosis.

12. The method of claim 9 wherein said imagewise exposure is carried out using an image or images obtained by computed radiographic means, digital radiographic means, or digitally scanning a radiographic image in a wet-processed radiographic film.